

Low-Density Parity-Check Codes for High Data Rate Receivers, Phase I

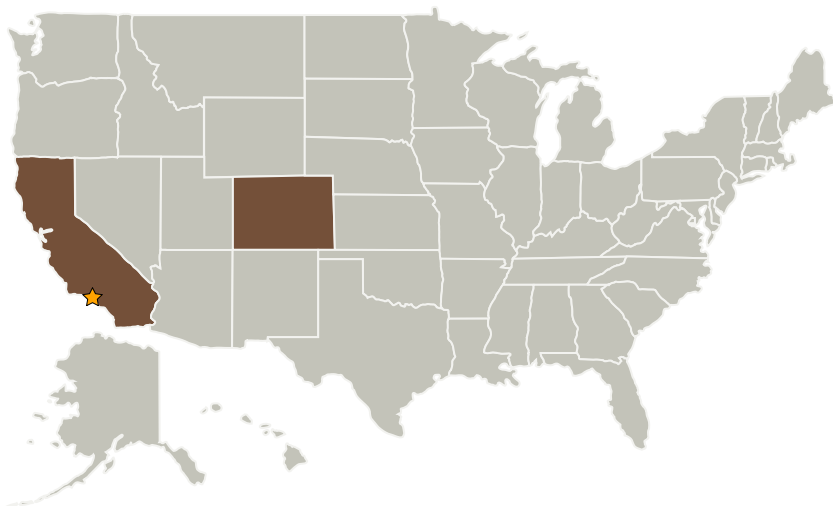
Completed Technology Project (2008 - 2008)



Project Introduction

Low-Density Parity-Check (LDPC) Forward Error Correction (FEC) schemes are excellent tools in optimizing telemetry data integrity within the limited space to ground RF spectrum available for today's and tomorrow's satellite systems. All ten of the LDPC codes called out in the CCSDS Orange Book CCSDS 131.1-O-1 are potentially powerful tools for space to ground communications link optimization for future near-Earth and deep-space science and exploration missions. With this Phase I Small Business Innovation Research (SBIR), RT Logic will endeavor to inventory and understand the 10 LDPC codes defined in CCSDS 131.1-O-1, to prototype a single Field Programmable Gate Array (FPGA) based LDPC decoder that can potentially be the core of the 10 LDPC decoders, verify the FPGA prototype of the general purpose LDPC core using a comprehensive Very High-Speed Integrated Circuit Hardware Description Language (VHDL) test suite and characterize the design for implementation into a Commercial-off-the-shelf (COTS) high data rate receiver. In Phase II, all of the 10 LDPC codes would be implemented into RT Logic's COTS high rate receiver in order to make the LDPC FEC schemes readily available to NASA, other Civil, the Department of Defense and commercial customers for use on their future space programs.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
RT Logic	Supporting Organization	Industry	Colorado Springs, Colorado

Primary U.S. Work Locations

California	Colorado
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

John Heskett

Technology Areas

Primary:

- TX10 Autonomous Systems
 - └ TX10.1 Situational and Self Awareness
 - └ TX10.1.3 Knowledge and Model Building